

REMARKS

In the last Office Action, the Examiner withdrew claims 34, 39 and 40 from further consideration as being directed to a non-elected invention. Claims 25-27 and 31-33 were withdrawn from further consideration as being directed to a non-elected species. The specification was objected to because the amendment in the replacement paragraph for the paragraph beginning on line 20 of page 15 does not conform to the original specification. Claims 21, 28, 35 and 37 were rejected under 35 U.S.C. §112, first paragraph, as failing to comply with the enablement requirement. Claims 21, 28, 35 and 37 were further rejected under 35 U.S.C. §112, second paragraph, for indefiniteness. Claims 21-24, 28-31 and 35-38 were rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent Publication No. 2001/0055459 to Yamada et al. ("Yamada") in view of U.S. Patent No. 5,738,576 to Ohno et al. ("Ohno"). Additional art was cited of interest.

In accordance with the present response, the specification has been suitably revised to overcome the Examiner's objection by providing the correct replacement paragraph for the paragraph beginning on line 20 of page 15 which conforms to the original specification. Claims 35 and 37 have been amended only to overcome the rejection under 35 U.S.C. §112, first and second paragraphs. Claims 36 and 38

have been amended only to conform to amended claims 35-38. Non-elected claims 34, 39 and 40 have been canceled. Non-elected claims 25-27 and 31-33 have been retained in the application pending allowance of generic claims 21, 22 and 28, or any other generic claim, as noted in the June 14, 2005 response to the May 18, 2005 Office Action. Claims 21-33 and 35-38 are currently pending in this application.

Applicants most respectfully request entry of the foregoing amendments since they merely comprise amendment of the specification to overcome the Examiner's objection by providing a replacement paragraph for the paragraph beginning on line 20 of page 15 which conforms to the original specification, amendment of claims 35 and 37 to overcome the Examiner's rejection under 35 U.S.C. §112, first and second paragraphs, and amendment of claims 36 and 38 conform to the amendments to claims 35 and 37, respectively. The subject matter of amended claims 35-38 has already been considered by the Examiner. In addition, the amendments substantially narrow any appealable issues because they cancel a number of other claims. Thus, entry of the foregoing amendments does not impose a burden on the Examiner and should not be denied.

Applicants request reconsideration of their application in light of the foregoing amendments and the following discussion.

Rejections Under 35 U.S.C §112, First and Second Paragraph

Claims 21, 28, 35 and 37 were rejected under 35 U.S.C. §112, first and second paragraphs. With respect to the first paragraph of Section 112, the Examiner contends that claims 21, 28, 35 and 37 fail to comply with the enablement requirement. With respect to the second paragraph of Section 112, the Examiner contends that claims 21, 28, 35 and 37 fail to particularly point out and distinctly claim the subject matter which applicants regard as the invention. Applicants respectfully traverse the Examiner's contentions.

Claims 35 and 37

With respect to claims 35 and 37, the Examiner contends that the specification does not provide support for the "mounting means" recited in the claims. Applicant's disagree with the Examiner's contention.

The "mounting means" recited in claims 35 and 37 corresponds to the holding holes formed by the concave holding parts 51 of the jig plate body 50 for holding the holding members 60. The concave holding part 51 is described on pages 18-19 of the specification and shown in Figs. 4A, 4B and 6.

Nevertheless, in order to expedite prosecution, claims 35 and 37 have been amended to delete the means-plus-function recitations while reciting the feature that the

longitudinal axis of the ferrule is disposed at an obtuse angle relative to the polishing surface of the polishing member during a polishing operation.

Claims 21 and 28

With respect to independent claims 21 and 28, the Examiner contends that the specification fails to disclose (Section 112, first paragraph) and that it is unclear (Section 112, second paragraph) how the ferrule and/or the optical fiber rotate in a direction of rotation opposite to the direction of rotation of the polishing member during a polishing operation. We strongly disagree with the Examiner's contention.

Independent claims 21 and 28 require a jig plate comprising a holding member having an engaging portion for detachable engagement with the connecting member of the optical connector plug to removably support the optical connector plug so that during a polishing operation, the ferrule (claim 21) or the end faces of the ferrule and optical fiber (claim 28) rotate in "a second direction of rotation opposite to the first direction of rotation." The "first direction of rotation" corresponds to the direction of rotation of the polishing member as recited in lines 9-10 of claim 21 and lines 2-3 of claim 28.

Contrary to the Examiner's contention, the rotation of the ferrule (claim 21) or the end faces of the ferrule and optical fiber (claim 28) in a direction opposite to the direction of rotation of the polishing member is clearly disclosed in the specification as originally filed. For example, page 20, line 4 to page 21, line 8 of the specification describes that the holding member 60 of the jig plate body 50 retains the ferrule 111 "so as to rotate in the direction opposite to the rotating direction of the platen 25" (i.e., the polishing member 27 is integrally mounted to the platen 25 for rotation therewith). A similar supporting description is provided on page 22, line 20 to page 23, line 16 of the specification.

Thus, with respect to the Section 112, first paragraph rejection, the disclosure relating to the rotation of the ferrule (claim 21) or the end faces of the ferrule and optical fiber (claim 28) in a direction opposite to the direction of rotation of the polishing member in the specification as originally filed would reasonably convey to one skilled in the relevant art that the inventors, at the time the application was filed, had possession of the invention claimed in claims 21 and 28. In re Wertheim, 191 USPQ 90, 96 (CCPA 1976).

Moreover, applicants respectfully submit that the language of claims 21 and 28 particularly points out and distinctly claims the subject matter which applicants regard as their invention, as required by 35 U.S.C. §112, second paragraph. When read in light of the complete patent document, as directed by the Court of Appeals for the Federal Circuit, the language of claims 21 and 28 are without any ambiguity. Miles Laboratories, Inc. v. Shandon, Inc., 27 USPQ2d 1123, 1126 (Fed. Cir. 1993).

In view of the foregoing, applicants respectfully submit that claims 21, 28, 35 and 37 are in full compliance with the requirements of 35 U.S.C. §112, first and second paragraphs, and request that the rejection of claims 21, 28, 35 and 37 under 35 U.S.C. §112, first and second paragraphs, be withdrawn.

Brief Summary of the Invention

The present invention is directed to a jig plate for supporting an optical connector plug and for use in combination with an end face polishing machine for polishing end faces of an optical fiber and a ferrule of the optical connector plug.

Prior to use in an optical connector, an optical communication fiber is adhered and fixed to a center hole of a

ferrule and then an end surface of the ferrule and an end surface of the fiber are simultaneously polished to provide a smooth mirror surface. If the polished surfaces of the ferrule and the fiber are not vertical to a center axis of the ferrule, or if the polished surfaces are damaged, the accuracy of an optical connector having such ferrules connected with each other is deteriorated, thereby resulting in an increase in signal loss. Therefore, it is required that the surfaces of the ferrule and the optical fiber be polished with high accuracy.

In a conventional end face polishing apparatus, an eccentric plate which rotates on a concentric circle of a self-rotation disc and a planetary gear which transmits rotation of a motor for revolution to the eccentric plate are combined with a polishing plate to cause the polishing plate to self-rotate and revolve. The end faces of the ferrules and optical fibers supported by a jig plate are pressed against the polishing member fixed to the polishing plate and polished. However, with the conventional end face polishing apparatus, it has been difficult to polish the end faces of the ferrules and optical fibers without causing variations in the polishing angle, radius of curvature and eccentricity. Further variations in ferrule lengths also occur after polishing.

The present invention overcomes the drawbacks of the conventional art. With reference to an embodiment shown in Figs. 1-9, the optical connector plug 100 is comprised of a plug housing 140 for supporting a ferrule 110 fixed to an end of an optical fiber 2 and a connecting member 145 connected to an exterior surface of the plug housing 140. The optical connector plug has a first axis 203 extending along the exterior surface thereof in a longitudinal direction of the connecting member 145. The end face polishing machine is comprised of a polishing member 27 having a polishing surface for undergoing rotational movement in a first direction of rotation to polish an end face of the ferrule 110 and an end face of the optical fiber 2 during a polishing operation.

The jig plate 40 has a jig plate body 50 and a mounting part 54 connected to the jig plate body 50 for mounting the jig plate 40 on the end face polishing machine. A holding part 51 is formed in a surface of the jig plate body 50. A holding member 60 removably supports the optical connector plug 100 in the holding part so that the end face of the ferrule 110 and the end face of the optical fiber 2 confront the polishing surface of the polishing member 27 when the jig plate 40 is mounted on the end face polishing machine. The holding member 60 has an engaging portion 62 for detachable engagement with the connecting member 145 of the

optical connector plug 100 to removably support the optical connector plug 100 so that during a polishing operation, the ferrule 110 rotates in a second direction of rotation opposite to the first direction of rotation while the end face of the ferrule 110 and the end face of the optical fiber 2 contact the polishing surface of the polishing member 27 at a preselected angle of inclination and while an axis 200 extending in the direction of inclination of the end face of the ferrule 110 and the end face of the optical fiber 2 coincides with a second axis 201 of the optical connector plug 100 disposed generally orthogonal to the first axis 203.

By the foregoing construction of the present invention, during a polishing operation the optical connector plug can be maintained at a precise orientation relative to the polishing member so that an axis extending in the direction of inclination of the end face of the ferrule and the end face of the optical fiber coincides with an axis of the optical connector plug disposed generally orthogonal to another axis of the optical connector plug extending along an exterior surface thereof in a longitudinal direction of the connecting member which is disposed on the exterior surface. By this orientation, the end face of the ferrule and the end face of the optical fiber are polished with improved polishing accuracy to reduce displacement between the center of

curvature of the end faces of the ferrule and optical fiber and a central axis of the optical fiber, thereby reducing insertion loss.

Traversal of Prior Art Rejection

Claims 21-24, 28-30 and 35-38 were rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent Publication No. 2001/0055459 to Yamada et al. ("Yamada") in view of U.S. Patent No. 5,738,576 to Ohno et al. ("Ohno"). The Examiner contends that the combined teachings of Yamada and Ohno discloses or suggests the structural and functional combinations recited in claims 21-24, 28-30 and 35-38. Applicants strongly disagree with the Examiner's contention.

Independent claim 21 is directed to a jig plate for supporting an optical connector plug and which is used in combination with an end face polishing machine for polishing the end face of an optical fiber and the end face of a ferrule fixed to an end of the optical fiber. Claim 21 requires that the optical connector plug has a plug housing for supporting the ferrule and a connecting member connected to an exterior surface of the plug housing, the optical connector plug having a first axis extending along the exterior surface thereof in a longitudinal direction of the connecting member. Claim 21 further requires that the end face polishing machine is

comprised of a polishing member having a polishing surface for undergoing rotational movement in a first direction of rotation to polish an end face of the ferrule and an end face of the optical fiber during a polishing operation.

Claim 21 further requires a jig plate comprised of a jig plate body, a mounting part connected to the jig plate body for mounting the jig plate on the end face polishing machine, a holding part formed in a surface of the jig plate body, and a holding member for removably supporting the optical connector plug in the holding part so that the end face of the ferrule and the end face of the optical fiber confront the polishing surface of the polishing member when the jig plate is mounted on the end face polishing machine. Claim 21 further requires that the holding member has an engaging portion for detachable engagement with the connecting member of the optical connector plug to removably support the optical connector plug so that during a polishing operation, the ferrule rotates in a second direction of rotation opposite to the first direction of rotation while the end face of the ferrule and the end face of the optical fiber contact the polishing surface of the polishing member at a preselected angle of inclination and while an axis extending in the direction of inclination of the end face of the ferrule and

the end face of the optical fiber coincides with a second axis of the optical connector plug disposed generally orthogonal to the first axis.

Applicants respectfully submit that the structural and functional combination recited in independent claim 21 is not disclosed or suggested by the combined teachings of Yamada and Ohno.

The primary reference to Yamada discloses a ferrule holder assembly for an optical fiber end face grinding apparatus (Figs. 1-4). A jig plate 1 is mounted opposite to a polishing plate 13 for polishing an end face of a ferrule 8 holding an optical fiber 9. The jig plate 1 has a jig plate body with a holding part 2 (i.e., an adapter) for holding the ferrule 8 at an inclination relative to a surface of the polishing plate 13 during a polishing operation.

As recognized by the Examiner, the jig plate disclosed in Yamada does not have a holding member having an engaging portion for detachable engagement with a connecting member of the optical connector plug to removably support the optical connector plug so that during a polishing operation, the ferrule rotates in a second direction of rotation opposite to the first direction of rotation, as recited in claim 21. The ferrule holder assembly disclosed by Yamada clearly does not permit the ferrule 8 and optical fiber 9 to rotate in a

direction opposite to the rotating direction of the polishing plate 13.

The Examiner cited the secondary reference to Ohno for its disclosure of an apparatus for providing a workpiece in which a ferrule 14 and a polishing member 12, 13 are rotated in different directions during a polishing operation (Figs. 2A-2B; col. 3, line 64 to col. 4, line 15). However, the combined teachings of Yamada and Ohno do not disclose or suggest the specific structural and functional combination of the optical connector plug, end face polishing machine and jig plate recited in independent claim 21 which permits the ferrule to rotate in a direction of rotation opposite to the direction of rotation of the polishing member during a polishing operation. More specifically, the combined teachings of Yamada and Ohno do not disclose or suggest an engaging portion of a holding member of a jig plate being configured for detachable engagement with a connecting member connected to an exterior surface of the plug housing of the optical connector plug while permitting rotation of the ferrule in a direction of rotation opposite to the direction in which the polishing plate rotates during a polishing operation, as recited in claim 21.

Moreover, claim 21 requires that the axis of the optical connector plug which extends in the direction of

inclination of the end face of the ferrule and the end face of the optical fiber coincides with another axis of the optical connector plug which is generally orthogonal to an axis (i.e., first axis) of the optical connector plug extending along the exterior surface thereof in a longitudinal direction of the connecting member. This relationship between the axes of the optical connector plug and the end faces of the ferrule and optical fiber, which are based on the positioning of a connecting member of the optical connector plug, is clearly not disclosed or suggested by Yamada or Ohno, either alone or in combination.

Since Ohno does not disclose or suggest the structural and functional combination recited in claim 21, it does not cure the deficiencies of Yamada. Accordingly, one ordinarily skilled in the art would not have been led to modify the references to attain the claimed subject matter.

Independent claim 28 is directed to a jig plate for use with an end face polishing machine having a polishing member for undergoing rotation in a first direction of rotation to polish end faces of an optical fiber and a ferrule fixed to an end of the ferrule of an optical connector plug during a polishing operation. Claim 28 patentably distinguishes from the combined teachings of Yamada and Ohno for the same reasons set forth above for independent claim 21.

Claims 22-24, 35-36 and 29-30, 37-38 depend on and contain all of the limitations of independent claims 21 and 28, respectively, and, therefore, distinguish from the references at least in the same manner as claims 21 and 28.

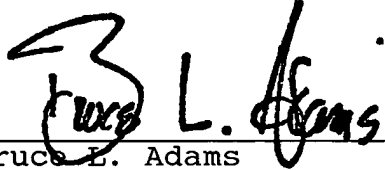
Applicants most respectfully request entry of the foregoing amendments since they merely comprise amendment of the specification to overcome the Examiner's objection by providing a replacement paragraph for the paragraph beginning on line 20 of page 15 which conforms to the original specification, amendment of claims 35 and 37 to overcome the Examiner's rejection under 35 U.S.C. §112, first and second paragraphs, and amendment of claims 36 and 38 conform to the amendments to claims 35 and 37, respectively. The subject matter of amended claims 35-38 has already been considered by the Examiner. In addition, the amendments substantially narrow any appealable issues because they cancel a number of other claims. Thus, entry of the foregoing amendments does not impose a burden on the Examiner and should not be denied.

In view of the foregoing amendments and discussions,
the application is believed to be in allowable form.
Accordingly, entry of this amendment and favorable
reconsideration and allowance of the claims are most
respectfully requested.

Respectfully submitted,

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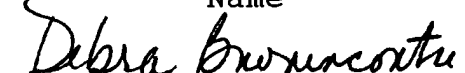
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Date